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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,342	12/15/2003	Deepak Shukla	84415AEK	4634

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EXAMINER

HON, SOW FUN

ART UNIT	PAPER NUMBER
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1772

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/736,342

Applicant(s)

SHUKLA ET AL.

Examiner

Sow-Fun Hon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/15/03.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-19, drawn to an article, classified in class 428, subclass 1.1.

II. Claim 20, drawn to a process, classified in class 427, subclass 163.1.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the aligned liquid crystal layer can also be made with the extra process step of tilting the substrate to drain off some of the solvent and provide the predetermined tilt, before the step of drying the coating.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Art Kluegel on 12/01/04 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this Office action. Claim 20 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

6. Claims 1, 14 are objected to because of the following informalities: The term “substrate” has been misspelt as “substratet”, and the term “more” has been misspelt as “ore”. Appropriate correction is required.

7. Claim 4 is objected to because it is unclear how 1 ring can be fused to itself unless it is fused to a heteroatom. Clarification is requested.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

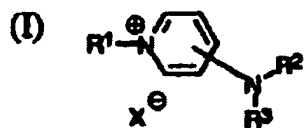
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 14, 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishikawa et al. (McElroy English translation of JP Publication No. 2002-038158), as evidenced by Swanson Technologies (The Periodic Table of the Elements).

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Regarding claims 1-6, 14, Nishikawa has a multilayer film comprising a substrate bearing an aligned (oriented) liquid crystal layer wherein the liquid crystal layer contains a salt [0008] represented by the formula (I) of Nishikawa below [0009].

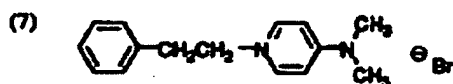


R' is an aliphatic group with 1 to 30 carbon atoms [0010] which overlaps the claimed straight or branched group of Applicant's R (claim 1), alkyl group of 1-25 carbon atoms of Applicant's R (claim 2) and alkyl group of 1-6 carbon atoms of Applicant's R (claim 3). N^+ is a cation chosen from period group Va of the Periodic Table of Elements, and thus corresponds to M^+ of Applicant, as evidenced by Swanson Technologies.

Swanson Technologies shows that N is a Va periodic group element. N^+ being a cation, it follows that X^- is the counterion for the salt. Therefore the pyridinium quaternary salt [0008] is an onium salt by Applicant's definition.

As shown above, N^+ of Nishikawa = M^+ of Applicant, and is a member of a 6-membered aromatic group, which is treated as Applicant's R group comprising a 5-membered ring fused to the N cation (claims 4, 14). An aromatic group is also known as an aryl group (claim 5), which is the genus of the heteroaryl group (claim 6) containing the N-atom in formula I above.

Regarding claim 7, Nishikawa teaches a phenyl group which corresponds to Applicant's R group. See the left side of formula (7) of Nishikawa below.



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Regarding claims 16-18, Nishikawa teaches the addition of approximately 0.05 wt % (part by weight) onium (pyridinium quaternary salt) to 100 parts by weight of the liquid crystal layer [0032], which is within the claimed range of up to 10 wt % (claim 17) and less than 2 wt. % (claim 18). Nishikawa teaches that the tilt (inclination angle) increased by 22 % ($\{33 - 27\} * 100 / 27$) [0034], which is within the claimed range of at least 10 % compared to the layer with no onium salt (claim 16).

Regarding claim 19, Nishikawa teaches that the multilayer film comprising the substrate bearing the aligned liquid crystal is used in a liquid crystal display [0002].

9. Claims 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishikawa, as evidenced by Swanson Technologies, and Lauher (Acid and Base Strengths).

Nishikawa, as evidenced by Swanson Technologies has been discussed above.

Regarding claims 11-12, Nishikawa teaches that the counterion X⁻ can be a bromine ion or a chlorine ion [0019], whose corresponding conjugate acids HBr and HCl have pK_as of -9 and -7 respectively, which are within the claimed ranges of less than 10 (claim 11) and less than 5 (claim 12), as evidenced by Lauher. Please note the negative sign.

Lauher shows that the conjugate acids HBr and HCl have pK_as of -9 and -7 respectively.

Applicant's specification discloses that X⁻ can be Br⁻ and Cl⁻ (page 16, formulae III-28 and III-29 respectively).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim 15 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishikawa, as evidenced by Swanson Technologies.

Nishikawa, as evidenced by Swanson Technologies, has been discussed above.

Although Nishikawa fails to teach that the salt is present in an amount sufficient to increase the tilt without changing the refractive index of the layer by more than 10 percent, the amount of approximately 0.05 wt. % taught by Nishikawa [0032] is small enough that the refractive index of the layer may not change by more than 10 percent, so that the claimed refractive index of the layer is inherent and hence is anticipated by Nishikawa. In the alternative, since the small amount of 0.05 wt. % already increases the tilt of the liquid crystal by 22 % ($\{33 - 27\} * 100 / 27$) [0034], it can be decreased in order to obtain a lower but still improved tilt angle, and hence would be the result of routine experimentation by one of ordinary skill in the art at the time the invention was made, in order to maintain the desired refractive index.

12. Claims 1, 8-10, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murai et al. (US 5,963,290), as evidenced by Swanson Technologies.

Regarding claims 1, 8-10, Murai has a multilayer film comprising a substrate (column 9, lines 35-45) bearing an aligned liquid crystal (LC) layer (column 7, lines 25-30). Murai teaches the addition of a monomer or oligomer to stabilize the tilt (rising direction) of the liquid crystal (LC) molecules (column 7, lines 16-21), which requires the use of a photo (light) initiator (column 9, line 1). Examples of the initiator are sulphonium and selenium salts (column 9, lines

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7-12), wherein the sulphonium and selenium cations are from group VIa of the Periodic Table (claim 8); and iodonium salts (column 9, lines 7-12), wherein the iodonium cation is from group VIIa of the Periodic Table (claims 9-10), as evidenced by Swanson Technologies.

Swanson Technologies shows that sulphur (S), and selenium (Se), are elements in group VIa of the Periodic Table, and that iodine (I) is in group VIIa of the Periodic Table.

Murai fails to teach the specific structure of the onium salt, which is the genus of the sulfonium, selenium and iodonium salt species. However, the claimed onium salt structure of $(R)_bM^+X^-$ wherein R is an aromatic group and b is 2 or 3, when used as a photoinitiator, is well known by one of ordinary skill in the art at the time the invention was made, as a common structure for the onium salt of each of the particular groups in the Periodic table, as evidenced by Glover.

Glover teaches onium salt photoinitiators, specifically sulfonium, selenium and iodonium salts (column 3, lines 30-35), and provides examples in the form of a triarylsulfonium salt (b of Applicant = 3) and a diaryliodonium salt (b of Applicant = 2) (column 3, lines 60-65). A triarylselenium salt in the form of $R^3_3Se+MX_n^-$ wherein R^3 is an aromatic carbocyclic radical having from 6 to 20 carbon atoms (column 3, lines 35-40), which is equivalent to R of Applicant (b of Applicant = 3). The structure of the onium salt in terms of Applicant's nomenclature is thus: aryl = R of Applicant; S⁺, Se⁺ and I⁺ = M⁺ of Applicant. It follows that the counterion of Glover (MX^- anion) is X⁻ of Applicant.

Regarding claim 13, Glover teaches that X⁻ of Applicant can be PF_6^- , BF_4^- (MX^- anion) (column 3, lines 50-55).

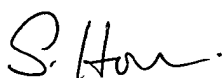
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Glover thus demonstrates that the claimed specific sulfonium, selenium and iodonium salts are common cationic photoinitiators. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the specific sulfonium, selenium and iodonium salts with the claimed onium salt structure of $(R)_bM^+X^-$ wherein R is an aromatic group and b is 2 or 3, taught by Glover, as the sulfonium, selenium and iodonium salt photoinitiators of Murai, in order to obtain the desired stabilization of the tilt (rising direction) of the liquid crystal molecules, as taught by Murai.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sow-Fun Hon

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